

GHG Emissions Management

LINKING GHG EMISSIONS MANAGEMENT TO CORPORATE STRATEGY, RISK AND PERFORMANCE

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Company background

VeriForm is a metal fabrication company operating a 26,000-square-foot facility in Cambridge, Ontario. VeriForm's core business is manufacturing custom parts, primarily for the mining, forestry, and machine-building sectors. Its vision is to lead in providing precision sheet metal and plate fabricating services with a focus on client satisfaction and continuous improvement.

The company's competitive advantage is its personalized service: within 24 hours of initial contact, VeriForm aims to provide the highest-quality output by using ISO management systems, and adhering to critical lead times of 98 per cent or better on-time delivery of products. The company's culture of continuous improvement and the accuracy of its parts and components enables VeriForm to add value for its clients through significant cost savings. This attention to detail impacts every process and product at the company, with an average on-time delivery rate of more than 91 per cent.

MANAGEMENT ACCOUNTING GUIDELINE

CASE STUDY



Overview

Case Study

Key Learnings

Resources

Overview

Founded over 23 years ago, VeriForm is a privately-held small business committed to environmental sustainability. Normally, one might not think of a metal fabrication company as a prime example of a business that takes sustainability seriously, but the company continues to be a leading example for the sector (and for Canadian small businesses).

In the mid-2000s, VeriForm's CEO became aware of the challenges posed to society and the economy by climate change and felt compelled to act. The CEO investigated how the company might be able to reduce GHG emissions generated by VeriForm's operations. The CEO's primary goal was to see if the company could reduce its energy use while also reaping reputational benefits for being proactive about mitigating climate change.

VeriForm's example helped establish the business case for acting on climate change, reducing GHG emissions, saving money and creating good jobs for employees. The company ultimately demonstrated that it's possible to reduce GHG emissions while also achieving business growth, lowering costs and enhancing employee engagement.

[Overview](#)[Case Study](#)[Key Learnings](#)[Resources](#)

Case Study

GHG emissions management application

Step 1: Understand the context

The business of metal fabrication is energy intensive. VeriForm's products are destined for the manufacturing of railcars, mining trucks, coast guard ships and helicopter guidance systems. Naturally, VeriForm's manufacturing plant is filled with heavy equipment, including large 350- and 900-tonne hydraulic brake presses, welding machines and plate rollers. And at 26,000-plus square feet, it also requires considerable energy for lighting, heating and cooling.

Step 1A - Assess regulatory requirements

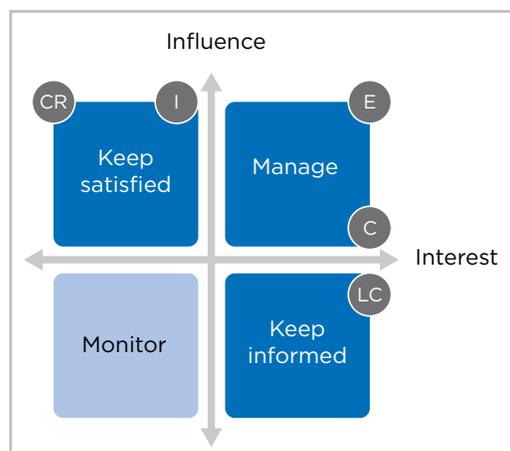
In order to assess its regulatory commitments, VeriForm needed to establish a baseline GHG emissions inventory to determine whether it exceeded thresholds for regulatory compliance. Of the electricity powering VeriForm's facility in Cambridge, 90 per cent was generated by zero-emitting sources. Given that the main source of the company's emissions came from the facility's direct energy usage, VeriForm did not exceed the thresholds for mandatory GHG reporting to federal and provincial governments.

Step 1B - Assess stakeholder interest in GHG emissions

VeriForm's focus on GHG emissions management was driven by its customer-centric focus, employee engagement and the local community. The CEO had a strong desire to combat climate change by reducing his company's GHG emissions.

The results of VeriForm's stakeholder mapping are shown on the right. As a private, founder-owned company, VeriForm did not have investors or financial regulators requesting GHG emissions information. However, the company did receive a credit rating (CR in the diagram) and it required insurance (I) in order to operate. The primary stakeholders seeking GHG emissions information from VeriForm were its employees (E), customers (C), and the local community (LC).

Based on its stakeholder mapping, VeriForm recognized that it should take action to reduce its GHG emissions and disclose its progress to customers, the local community, and current and prospective employees. This meant linking the company's GHG emissions with its core values of customer service and continuous improvement. VeriForm achieved this by tracking not only emissions reductions, but also the initial cost (and cost savings) of each reduction initiative. And with the growing interest amongst current employees in the company's emissions reduction efforts, VeriForm saw an opportunity to enhance employee attraction and retention by aligning the values of the company with the values of its workforce. Given



that VeriForm is privately held, the website was determined to be the most appropriate channel to communicate GHG emissions data and reduction initiatives to stakeholders.

Step 2: Evaluate company-specific circumstances

Step 2A: Understand reporting frameworks and third-party verification requirements

VeriForm opted to use the GHG Protocol (its corporate standard), the standard GHG inventory method in the private sector. Since the company was voluntarily preparing a first-year inventory, it decided not to seek third-party assurance. In the future, the company intends to have its GHG reports verified to add credibility to the results, especially as it sets GHG reduction targets and reports on progress against these targets.

Step 2B: Establish organizational scope and boundaries

VeriForm opted to use the control approach to set boundaries for its GHG emissions inventory. Since the company 100 per cent owns and operates just one facility, the financial control approach most accurately reflected GHG emissions. Further, since VeriForm planned to develop emissions reduction targets, the control approach made good sense.

In determining the scope of its GHG emissions inventory, VeriForm opted to report on Scope 1, 2, and 3 GHG emissions. The CEO had easy access to electricity usage information for the company's facility, which enabled him to calculate Scope 1 and 2 emissions from energy usage. Scope 3 calculations were more challenging. The CEO had to make a series of assumptions to calculate GHG emissions from the commutes and business travel of employees. It was important to the CEO that VeriForm included Scope 3 GHG emissions because employees were identified as a primary stakeholder.

The following table provides a snapshot of VeriForm's GHG emissions inventory of Scope 1 and Scope 2.

| Year | Total Emissions | Scope 1 | Scope 2 | Carbon Offsets |
|------|-----------------------------|---------|---------|----------------|
| | CO ₂ e in tonnes | | | |
| 2006 | 261.45 | 130.36 | 90.42 | |
| 2007 | 257.92 | 138.38 | 78.85 | |
| 2008 | 155.95 | 70.01 | 44.25 | |
| 2009 | 90.44 | 34.51 | 15.05 | |
| 2010 | 96.74 | 25.9 | 23.16 | |
| 2011 | 88.82 | 32.59 | 16.73 | |
| 2012 | 75.95 | 27.91 | 17.45 | |
| 2013 | 77.83 | 44.39 | 9.45 | |



| Year | Total Emissions | Scope 1 | Scope 2 | Carbon Offsets |
|------|-----------------------------|---------|---------|----------------|
| | CO ₂ e in tonnes | | | |
| 2014 | 60.13 | 33.54 | 4.88 | |
| 2015 | 66.46 | 41.43 | 4.49 | 70 |
| 2016 | 63.92 | 37.61 | 3.7 | 64 |
| 2017 | 58.01 | 35.02 | 1.81 | 60 |
| 2018 | 70.27 | 38.22 | 2.04 | 72 |

Step 2C: Identify GHG emissions sources and activity data

As a metal fabrication company, VeriForm's primary sources of GHG emissions came from stationary and mobile combustion – electricity and fuel consumption. In order to calculate VeriForm's GHG emissions, the company took an inventory of its utility bills. The CEO also analyzed fuel logs for the company's vehicles and fuel invoices for its heavy and stationary equipment.

Step 2D: Calculate GHG emissions inventory

Following the technical guidance outlined in the GHG Protocol, the CEO used the activity data from Step 2C to quantify VeriForm's GHG emissions in a simple Excel spreadsheet. VeriForm's first-year GHG emissions in 2006 were 261 tonnes of CO₂e. The following table provides a snapshot of VeriForm's GHG emissions inventory results from their baseline year in 2006 (January 1 to December 31).

| | Activity amount | Amount units | Emissions (tCO ₂ e) |
|-------------------------|-----------------|----------------|--------------------------------|
| FT gasoline (volume) | 12,167.41 | Litres | 28.30 |
| Natural gas | 43,960.99 | Cubic metres | 83.03 |
| Propane | 12,318.47 | Litres | 19.02 |
| Sum for Scope 1 | | | 130.36 |
| Electricity | 388,048.72 | Kilowatt hours | 90.42 |
| Sum for Scope 2 | | | 90.42 |
| EC gasoline - Unknown | 188,394.00 | Kilometres | 40.28 |
| Landfill waste (volume) | 48.00 | Cubic yards | 0.37 |



| | Activity amount | Amount units | Emissions (tCO ₂ e) |
|------------------------|-----------------|--------------|--------------------------------|
| Tap water | 295.94 | Cubic metres | 0.04 |
| Sum for Scope 3 | | | 40.68 |
| Totals | | | 261.45 |

Step 3: Set targets and develop strategy

Step 3A: Assess context

From the outset, the CEO knew he wanted to set targets for GHG emissions reductions. The CEO was concerned about the issue of climate change and wanted to show that businesses can achieve both emissions reductions and company growth.

Below are VeriForm's responses to the checklist, resulting in seven "yes" responses, indicating that the company would benefit from setting a GHG emissions reduction target.

| Questions | Yes/No |
|---|--------|
| 1. Does the company operate in a high-emitting sector (e.g., oil and gas, transportation, buildings, electricity, steel, cement and aluminum manufacturing, agriculture, waste management ¹)? | Yes |
| 2. Does the company expect more stringent regulation on GHG emissions in the future? | Yes |
| 3. Are the company's GHG emissions significantly higher than those of its peers? | No |
| 4. Have sector peers set GHG reduction targets? | No |
| 5. Are cost savings available from GHG reduction activities (e.g., energy efficiency)? | Yes |
| 6. Do any key stakeholders want the organization to reduce emissions and/or set a target in response to climate change? | Yes |
| 7. Do GHG emissions pose a reputational risk to the company? | No |
| 8. Does the company have a leadership opportunity to demonstrate corporate responsibility to its key stakeholders by setting a target? | Yes |
| 9. Are there any opportunities to participate in voluntary carbon offset markets to generate revenue from GHG reduction projects? | Yes |
| 10. Are there R&D opportunities to develop low carbon products and solutions? | Yes |

1 Sectors are based on emissions breakdown by sector in *Canada's National Inventory Report, 1990-2017*.

Step 3B: Set GHG reduction targets

VeriForm used 2006 as its base year and started on its initial 10-year energy saving effort in 2007. The company set both absolute and intensity-based targets:

- Absolute target = 45 per cent reduction of GHG emissions from 2006 levels by 2016
- Intensity-based target = double sales per kWh of energy consumed from 2006 levels by 2016

The CEO opted to set an absolute target to ensure the company was making meaningful contributions to mitigating climate change by reducing overall emissions. This intensity-based target ties a traditional business metric (sales growth) to the company's emissions impact (its energy consumption).

Step 3C: Establish an action plan, including KPIs for monitoring

The targets established in Step 3B became the foundation for the organization's action plan to reduce GHG emissions. VeriForm's next step was to evaluate opportunities for emissions reductions using the results of the baseline inventory calculated in Step 2. In doing so, the CEO focused on "low-hanging fruit" (i.e., prioritizing actions that would result in the fastest, cheapest, and highest-impact GHG emissions reduction programs, in many cases with one-year or less payback periods).

| Energy-saving initiative | Description |
|--|---|
| Turn off printers, monitors, computers at night | Simple acts, such as turning off office equipment, enabled VeriForm to save on energy costs immediately, with no initial cost required. |
| Disconnect wire heating on five bay doors | In the winter, the warehouse's bay doors were being kept open an average of four hours a day while delivery trucks unloaded. In order to save energy while the doors were open, an electrician installed a limit switch on each door that would turn the heat off in the shop when the doors were opened. |
| Install tamper-resistant programmable plant thermostat | Installing a programmable thermostat that couldn't be tampered with by staff significantly limited fluctuations in electricity consumption. |
| Replace HID plant lighting with T5 lights | T5 lights use 50 per cent less electricity than HID lights, last three to four times longer, and emit better light over their life. They are also more compact and energy efficient than the older, larger T8 and T12 lights. |
| Install equipment capacitors to raise power factor | VeriForm reviewed its electrical bills to find that the power factor (PF) was less than 90, which meant its monthly electrical costs were 20 per cent higher than a 90-plus PF. The solution was to install capacitors on individual pieces of equipment. |

VeriForm implemented a total of 37 projects between 2006 and 2009 in order to work toward its GHG target. By 2019, the company implemented more than 100 energy-saving initiatives.



Step 4: Establish appropriate governance

Step 4A: Establish formal accountability

From the outset, the CEO emphasized that reducing energy consumption and GHG emissions was a strategic priority for VeriForm. The CEO communicated the importance of emissions reduction initiatives to employees along with expectations for their participation in the company's energy-saving initiatives.

While Scope 3 emissions were not as significant as Scope 1 and 2 emissions, the CEO strived to create a culture where staff would extend energy-reduction efforts to their home lives, introducing incentives for employees who made energy-efficient purchases. For example, the CEO awarded \$250 to employees who bought a new fridge with an Energy Star rating and \$2,000 to those who bought a hybrid vehicle to commute to work. Engaging employees in the company's effort to reduce emissions also improved employee engagement and productivity.

Step 4B: Establish data collection systems, internal controls, and processes for GHG emissions reporting

VeriForm used project-specific data to calculate initial costs, annual savings, annual GHG reductions, returns on investment, and payback periods. This enabled the CEO to monitor results by project, rather than overall results, allowing VeriForm to tweak underperforming projects and upscale well-performing projects.

Most of the data VeriForm used to calculate GHG emissions came from electricity and natural gas consumption on utility bills, which allowed for year-over-year comparability. The company applied the same data collection and quantification processes to new energy-saving projects, enabling the direct comparison of initiatives over time.

VeriForm's finance and accounting department measured and monitored the initial costs, annual savings, returns on investment, and payback periods for each energy-saving project. CPAs on the team, with their quantitative and analytical skills, evaluated the cost/benefit and effectiveness of each project, allowing the company to prioritize its energy-saving efforts.

Step 5: Disclose to stakeholders

Step 5A: Determine if external disclosure is required or voluntary reporting is desirable

VeriForm is not a public company, so it is not required to disclose its GHG emissions externally. However, based on its stakeholder mapping and significant employee backing, VeriForm elected to voluntarily report its GHG emissions and action plans to demonstrate leadership, corporate responsibility, and transparency.

Step 5B: Determine reporting framework(s)

Given that VeriForm is a small, privately-held company and doesn't have investors, it didn't consider the TCFD, SASB, and CDP reporting frameworks optimal, as they are meant for an investor audience. VeriForm opted to publish its GHG emissions, action plans and financial results on a [dedicated page](#) of the company website.



CPAs prepared the underlying analysis and charts with key data on initial costs, annual savings, returns on investment, and payback periods for each energy-saving project. Further, they helped determine the most relevant reporting frameworks based on the target audience of employees and customers for the company's GHG reporting.

VeriForm's action plan and results: Drastic cuts to GHG emissions and significant cost savings

Since 2006, the company has reduced its carbon footprint by 77 per cent, far surpassing its initial goal of a 50 per cent reduction in absolute GHG emissions by 2017. VeriForm also exceeded its intensity-based target by tripling its sales per kWh of energy consumed, from \$6.12 to \$19.55. Even more remarkably, the company achieved these GHG reductions while increasing its staff by 30 per cent and more than doubling its building footprint.

The table below ranks the company's top five energy-reduction projects by annual cost savings and GHG reductions:

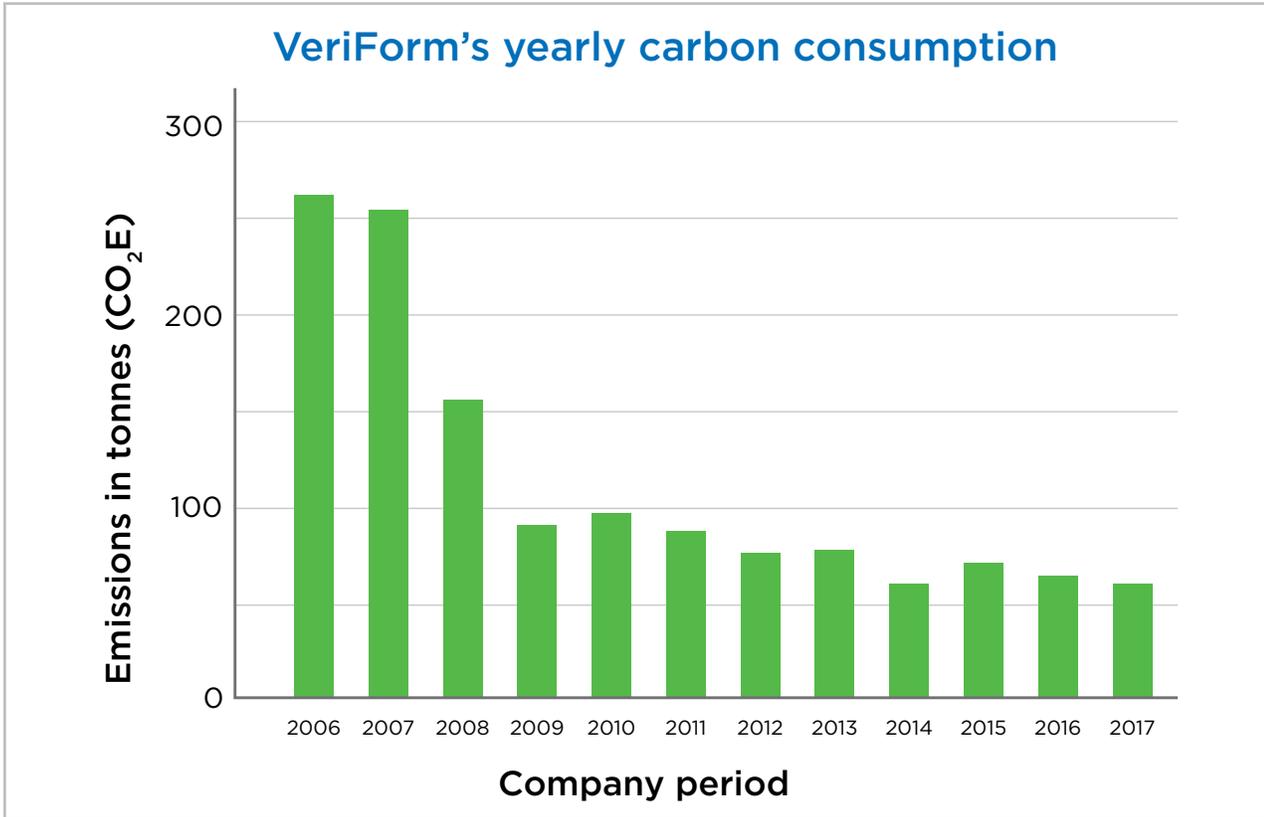
| Project | Initial cost | Annual savings | Annual CO ₂ reduction (kg) |
|--|--------------|----------------|---------------------------------------|
| Turn off printers, monitors, computers at night | \$250 | \$2,978 | 3,487 |
| Disconnect wire heating on five bay doors | \$1,200 | \$7,893 | 47,699 |
| Install tamper-resistant programmable plant thermostat | \$1,200 | \$13,911 | 84,067 |
| Replace HID plant lighting with T5 lights | \$8,000 | \$20,916 | 26,275 |
| Install equipment capacitors to raise power factor | \$11,285 | \$24,118 | 28,243 |

The company's initiatives ended up being focused on data gathering, numbers, and calculations – something that [speaks directly to CPAs' skill sets](#). The following charts show the financial results and GHG emissions reduced for all 37 projects and the top five projects undertaken at VeriForm between 2006 and 2009:

| | All 37 projects | Top 5 projects |
|--|-----------------|----------------|
| Total initial cost of all projects | \$46,774.70 | \$21,685.00 |
| Annual savings | \$91,263.26 | \$71,818.02 |
| Annual CO ₂ emissions reduced | 232,613 kg | 193,823 kg |
| Return on investment | 195% | 331% |
| Average payback period | 6.2 months | 3.7 months |



VeriForm’s efforts have reduced the company’s annual GHG emissions from 261 tonnes of CO₂e in 2006 to 60 tonnes of CO₂e in 2017. With the help of relatively inexpensive carbon offsets (about \$1,600 annually for 60 tonnes of CO₂e offsets), the plant now bills itself as carbon neutral.



Overview

Case Study

Key Learnings

Resources

Key Learnings

In just three years, VeriForm invested \$46,186 in over 42 energy-saving projects and the result was a reduction in annual operating costs, specifically energy costs, of \$89,152. Factoring in future energy price increases, the company expects to save \$1.42 million dollars over the next decade. In addition, as of December 2017, VeriForm has reduced its GHG emissions by 202 tonnes per year, which is equivalent to planting more than 10,000 trees.

Beyond the hard numbers, the company also experienced reputational benefits in the local community and improved employee engagement and productivity. VeriForm was able to engage staff to participate in the company's energy-saving efforts, which enabled these impressive results.

As the company continues to reduce GHG emissions and its energy consumption, CPAs will provide the necessary analytical skills and capabilities to identify and prioritize the business case for energy-saving projects, measure and monitor results over time, and report externally (on the company's website) to key stakeholders.



Overview

Case Study

Key Learnings

Resources

Resources

Readers are encouraged to refer to Appendix A of the primer for useful resources. Additional resources are below, including new financial reporting resources released since the primer was published.

Technical GHG emissions quantification

- [Environment and Climate Change Canada, *Technical Guidance on Reporting GHG emissions*](#)
- [United States Environmental Protection Agency, *Guide to Greenhouse Gas Management for Small Business & Low Emitters*](#)
- [ISO 14064-1: Part 1, “Organization Level GHG emissions Inventory Guidance”](#)
- [ISO 14064-2: Part 2, “Project Level GHG emissions Inventory Guidance”](#)
- [ISO 14064-3: Part 3, “Third-Party Validation and Verification”](#)
- [ISO 14065: “Requirements for Third-Party Validation and Verification Firms”](#)
- [Greenhouse Gas \(GHG\) Protocol](#)

Reporting and risk management guidance

- [TCFD Implementation Guide - Using SASB Standards and the CDSB Framework to Enhance Climate-related Financial Disclosure in Mainstream Reporting](#)
- [TCFD Annex: Implementing the Recommendations of the TCFD](#)
- [TCFD Good Practice Handbook](#)
- [Science-Based Targets](#)
- [COSO and the World Business Council for Sustainable Development \(WBCSD\), *Applying Enterprise Risk Management to Environmental, Social and Governance-related Risks*](#)

Financial reporting resources

- [CPA Canada, *Progressive Investors and Corporate Disclosure*](#)
- [CPA Canada, *Disclosing the Impact of Climate Change: A Process for Assessing Materiality*](#)
- [CSA Staff Notice 51-358: *Reporting of Climate Change-related Risks*](#)



About the author

Sarah Keyes, CPA, CA, is a principal at ESG Global Advisors. With a decade of diverse experience as a thought leader, consultant and auditor, Sarah is a recognized voice on the financial impacts of environmental, social and governance (ESG) issues for the Canadian business community. She is a speaker, author and facilitator on the impacts of climate change risks and opportunities on business strategy, risk management and performance. For more information, visit www.esglobaladvisors.com.



Overview

Case Study

Key Learnings

Resources



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